

3.0 RESEARCH AND RECOVERY ELEMENTS AND RECOVERY PROGRAM IMPLEMENTATION

Given the common goal of conserving endangered fish species and their habitats while water resource development proceeds in the San Juan River basin consistent with applicable laws, a comprehensive program is required to address both. All Participants recognize that both the biological requirements of the endangered fish species and the management of San Juan River Basin waters are complex. Therefore, a broad range of measures are proposed herein to enable a cooperative effort to identify and quantify factors which limit the abundance and survival of endangered fishes, to develop strategies to improve their status and means to evaluate the success of such endeavors, and to recover and delist the species under the authority of the Endangered Species Act.

The essential research elements describe the basic research upon which much of the subsequent research and recovery activities will be based. The recovery elements define the major categories of activities that will be conducted to recover endangered fish species and maintain the native fish community in the San Juan River basin. Research efforts will be directed toward obtaining the information needed for identification of factors that might act to limit the recovery of the Colorado squawfish and razorback sucker. Based upon that information, an analysis of actions to remove or diminish such limiting factors and promote recovery will be accomplished. These actions will be considered, evaluated, consulted upon, and implemented if found to be necessary and effective. Such actions include but are not limited to habitat modification (e.g., flow or non-flow induced improvement of low velocity habitats or side channels), artificial control of non-native species, artificial propagation of native species for augmentation of existing natural populations and reintroduction into historic habitat, modification or removal of impediments to fish movement, and improvement in water quality. Any action undertaken with the goal of contributing to the recovery of the endangered fish species will be closely monitored to evaluate the efficacy of the approach.

3.1 ESSENTIAL RESEARCH FOR LONG RANGE PLAN AND PROGRAM GOAL DEVELOPMENT

3.1.1 Statement of Problem

A small reproducing population of Colorado squawfish persists in the San Juan River. Since 1987, 21 adult specimens of Colorado squawfish have been captured and several others observed between Bluff, Utah and the Hogback, New Mexico. In 1987, 1988, and 1990, young of year squawfish were collected downstream of

Shiprock, near Bluff, and in the inflow area of Lake Powell. One adult Colorado squawfish was also collected in the San Juan Arm of Lake Powell.

Only one razorback sucker has been collected in the San Juan River since systematic research began in 1987. During that period, however, several specimens of razorback sucker were captured in the San Juan River inflow area of Lake Powell. Many of the specimens of razorback sucker captured were in spawning condition, but no reproduction or recruitment was documented.

Although archaeological evidence and two specimens (of unconfirmed identity) indicate bonytail historically occupied the San Juan River, no individuals have been captured since systematic investigations began in 1987.

Adults of Colorado squawfish are found in habitats ranging from low-velocity interfaces of tributary mouths and the San Juan River to main channel, rapid velocity deep runs. Within the San Juan River, the extent and success of annual spawning, recruitment, or survival of young Colorado squawfish has not been determined. Spawning is believed to occur in the San Juan River during July and perhaps August. The location of spawning areas in the San Juan River is not known, but successful Colorado squawfish reproduction does occur when conditions are favorable in the river as was evidenced during the 1987, 1988, and 1990 surveys. Young-of-year Colorado squawfish are typically captured in shallow backwater or side-channel habitats with silt and sand substrates and little or no current.

Adults of razorback sucker normally inhabit a variety of habitats including quiet eddies, pools, and mid-channel runs. They are usually found over a sand or silt substrate, but can also occur over gravel and cobble bars in the spring during spawning. Spawning may occur in Lake Powell, or lowermost San Juan River, but recruitment of young-of-year razorback sucker has not been documented in the San Juan River.

Within the river, the overall range of Colorado squawfish and razorback sucker and that of individuals of each species are not known. The extent or types of habitat normally occupied by adults of either species in the San Juan River is poorly known. Spawning and nursery habitats of neither species have been identified or characterized.

3.1.2 Course of Action

3.1.2.1 Research

- a. Intensive studies will be conducted to determine the relative abundance and distribution of endangered fishes,

other native, and non-native fishes. These studies include, but are not limited to, adult monitoring/radio telemetry investigations, ichthyofaunal surveys of tributary streams, and secondary channel ichthyofaunal characterizations.

- b. Reproduction and recruitment, if any, will be documented. Areas of reproductive activity and nursery habitats will be identified and characterized. This information will be used to evaluate responses to different volumes of water released (including timing and duration) from Navajo Dam and to identify areas of essential habitat.
- c. Seasonal and longitudinal distribution of endangered, other native, and non-native fish species will be documented in response to various flow releases from Navajo Dam. Habitats important to maintenance of other native and non-native fish species will be identified and characterized in relation to different flow regimes.
- d. Information gathered will be utilized as the foundation for identifying and evaluating the need to implement other recovery actions, including, but not limited to, habitat modification (flow or mechanically induced) and population augmentation.
- e. Monitor and evaluate on a regular basis any recovery action implemented as a result of this research.

3.1.2.2 Recovery

- a. The Program Coordinator and the Biology Committee will cooperatively develop a long range plan to enable achievement of recovery of the endangered fish species of the San Juan River basin.
- b. Develop population recovery goals for San Juan River endangered fishes consistent with the approved Colorado Squawfish Recovery Plan, the recovery plan to be prepared for the razorback sucker, and Upper Basin Recovery Implementation Program.

3.2 PROTECTION OF GENETIC INTEGRITY AND MANAGEMENT AND AUGMENTATION OF POPULATIONS

3.2.1 Statement of Problem

The relative genetic distinctiveness of the San Juan River populations of Colorado squawfish and razorback sucker have not been determined. At critically low levels, the populations of these species may be vulnerable to adverse demographic or environmental events which severely diminish genetic variability

or population survival potential. Indeed, the population of razorback sucker may be at such low levels in the San Juan River basin that natural recruitment to self-sustaining levels may not be possible. These populations, particularly that of the razorback sucker, may also be of such low levels that monitoring responses to test flows in the San Juan River in order to identify the habitat flow needs of the species is impaired, and habitat use by these species cannot be documented.

3.2.2 Course of Action

3.2.2.1 Research

- a. Obtain tissues following protocol developed by the Service (Upper Basin Recovery Implementation Program) and, based upon appropriate assays, genetically characterize and evaluate relationships of populations of San Juan River endangered species to those of other basins.
- b. Evaluate efficacy of using neutered fish to locate spawning habitats and aggregations of wild populations of endangered fish species.
- c. Utilizing data concerning current distributions and abundance of each species, evaluate reproductive and recruitment potentials of each, consider results of genetic studies, and evaluate the need to establish protected gene pools of each.
- d. Monitor and evaluate on a regular basis the success (or failure) of any recovery action implemented as a result of this research.

3.2.2.2 Recovery

- a. If necessary, establish refugia with stock taken from the wild.
- b. Evaluate the need to augment wild populations of endangered fish species and, if necessary, develop hatchery propagation programs. Augment wild populations of both or either endangered fish species if deemed necessary, desirable, and likely to improve status
- c. Evaluate the need and efficacy of cryogenic gamete preservation; implement if feasible.

3.3 PROTECTION, MANAGEMENT, AND AUGMENTATION OF HABITAT

3.3.1 Statement of Problem

Modification and loss of habitat have contributed to the decline of the Colorado squawfish and razorback sucker in the San Juan River. For example, young-of-year Colorado squawfish are most often found in low-velocity nursery and feeding habitats such as backwaters and side channels. Paucity of such habitats or water quality may be limiting recruitment. These habitats can be created and seasonally maintained by manipulating river flow.

Regulation structures such as Navajo Dam can be operated to control river flow and temperature to maximize the quantity and quality of habitats in certain river reaches during periods when they are most critical to the endangered fish species. These habitats can also be developed by connecting existing side channels, gravel pits or ponds to the river through the provision of beneficial flows or channel modification. The trade-offs of providing this habitat through flow manipulation or channel modification will be examined in light of the dual goals of this Implementation Program, with emphasis on providing the habitat in the most effective manner.

Recovery of these species may be aided by protecting or enhancing habitat through management techniques, such as habitat flow management, protection of habitats and flow, or other measures. First, however, the quantity and quality of available habitats must be assessed, and based upon this information, decisions can be made as to how to best achieve the desired results.

Federal, state, local, and tribal agencies will work cooperatively and expeditiously to quantify, protect, manage and, where appropriate, augment flows and habitats of the San Juan River. The water needed to provide flows for the recovery of endangered fish species (habitat flows) will be protected under this Implementation Program in a manner consistent with all state and tribal laws.

3.3.2 Course of Action

3.3.2.1 Research

Important reaches of the San Juan River for different life stages of the endangered fishes will be identified. Those reaches will be monitored during releases of test flows from Navajo Dam to determine habitat quality and characteristics over an array of flow regimes and to identify and quantify the response of the endangered fish species to specific flows at these locations. In addition, responses of other native and non-native fish species will be characterized. The research necessary for this effort is

listed below:

- a. Characterize existing geomorphic and habitat conditions of the river preparatory for detailed habitat quantification and characterization.
- b. Identify reaches of the river with similar geomorphic and habitat conditions.
- c. Determine usage of specific habitats by endangered fishes as well as other native and non-native species.
- d. Quantify habitat availability and characteristics at different flows to assist in the determination of the biological response of endangered fish species to test flows in the San Juan River. Evaluate the biological response of other species.
- e. Physical habitats will be characterized, quantified, and correlated to flow conditions.
- f. Complete detailed habitat mapping of representative sub-reaches, including hydraulic characteristics for later modeling.
- g. Assess dynamics of the geomorphology of the river and the effects of flow on changes in geomorphology and habitat.
- h. Model flow-habitat relationships.
- i. Monitor fate and usage by all species of habitats maintained or created by flow regimes, or other means. Evaluate need to continue management practices initiated as a result of this research.

The quantification and characterization of habitats and their use by various life stages of the endangered fish species will be dependent upon other research and recovery elements.

3.3.2.2 Recovery

- a. Information gathered will be utilized to identify specific actions and to evaluate the need for physical modification of habitats to aid in the recovery of the endangered fish species.

If habitat modification actions are to be implemented (including, but not limited to, removal of impediments to fish passage, or creation of required but unavailable habitats), appropriate permits, National Environmental Policy Act, Clean Water Act, and

Endangered Species Act compliance will be acquired or completed.

- b. After determining appropriate flow needs, the Biology Committee, with input from the Navajo Dam Operating Committee, will recommend specific flow regimes to the Service. This information will be utilized by the Service in coordination with the Bureau of Reclamation to determine reservoir releases needed for the endangered fish species.
- c. It is anticipated that the source water for habitat flows will be derived mainly from the operation of Navajo Dam and other sources. Based upon the results of the research accomplished under this Implementation Program, the Bureau of Reclamation has agreed to operate Navajo Dam to mimic a natural hydrograph for the life of the Animas-La Plata Project, provided that the research shows that this type of hydrograph is beneficial to recovery of the endangered fish species. The quantities of water needed for recovery may be greater or lesser than the quantities discussed in the Biological Opinion issued for the Animas-La Plata Project. These flows are dependent upon what is ultimately determined to be needed to achieve recovery of the endangered fish species.
- d. If habitat flow needs are identified that cannot be met by reoperation of Navajo Dam, potential sources of water to meet those needs will be identified on a case-specific basis. Obtaining the water from other sources will be the responsibility of the Participants in this Implementation Program or other affected entities and will occur in accordance with the following process:
 - 1. Once habitat flow needs have been quantified, the Service will request from staffs of the appropriate state and tribal agencies and others recommendations on the physical and legal means for providing the desired habitat flows. The alternatives will be provided, together with estimates of costs, methods of implementation, time frames, and procedural requirements to the Implementation Program Participants.
 - 2. Implementation Program Participants will review the available alternatives, prepare recommendations, and implement the recommendations through cooperative efforts under the auspices of this Implementation Program. The Service, in

cooperation with the Bureau of Reclamation and responsible state and tribal entities, will subsequently monitor the efforts of all Participants to ensure that the required habitat flows are provided.

3. Water rights acquired under the auspices of this Implementation Program will not be acquired through condemnation. If these rights are held by an entity other than the Service, the Service must be assured that the protection of such water rights will be enforced.
 4. Habitat flows will be administered by the respective State Engineers and tribal authorities pursuant to state and tribal laws.
- e. The success of this Implementation Program is contingent upon the legal protection of water for habitat flows pursuant to federal, state, and tribal laws. The Signatories to the Cooperative Agreement agree that, to the extent of their jurisdiction and within the context of their respective legal authorities and subject to existing developed rights, their government will protect storage releases from Navajo Reservoir and any other water acquired under this Implementation Program for the benefit of listed fish so that the flows remain undiminished, except for carriage losses, to and through the habitat of endangered fish species to Lake Powell. The authorities by which this will be achieved by the Navajo Nation and the States of Colorado, Utah, and New Mexico is described in Appendices B through E.
- f. There are no shortages anticipated to the water supply for the depletions identified in the baseline for the Animas-La Plata Project during the research period.

Upon completion of, or during the research period, the water flow requirements of the endangered fish species will be analyzed and the issue of shortages, if any, will be addressed by the Coordination Committee under this Implementation Program. If the issue of shortages is not resolved under this Implementation Program, the issue will be considered as new information which may result in reinitiation of consultation and will be resolved through the section 7 process.

3.4 WATER QUALITY PROTECTION AND ENHANCEMENT

3.4.1 Statement of Problem

Increased loading of the San Juan River and its tributaries with soil salts and elemental contaminants from irrigation return flows, urban runoff, contaminated groundwater, mine waste runoff, brine salt discharges from oil and gas wells, and oil refinery wastes degrade water quality and may be contributing to the decline of Colorado squawfish and razorback sucker as well as other native fish species in the San Juan River basin. Water quality studies in the San Juan River basin have previously focused on trace-element residues and organochlorine in fish and wildlife. Comparison of data from 1980 and 1984 with 1973 data on elemental residues in the Farmington area indicates residual levels of many elements not only are elevated but may be gradually increasing. Data on the toxic effects of selected chemicals on endangered fish species are being collected and evaluated. However, the results of these studies may have limited application for the San Juan River. The investigations to date have only considered the toxicity of waterborne concentrations of inorganic selenium and other elements to the Colorado squawfish, razorback sucker, and the bonytail chub. These studies have not addressed the effects of long-term exposure to selenium (organo-selenium) in the diet of these species and potential impacts to survival, growth, and reproduction of endangered fish species or other components of the aquatic environment. As survival of other native fish species as well as aquatic invertebrates is essential to survival of the endangered fish species, investigations on the effects of various contaminants upon all components of the aquatic communities of the San Juan River basin are critical.

Monitoring of existing water quality conditions in the San Juan River drainage is considered inadequate to provide the information upon which to base analysis of current land management practices (oil and gas development, agriculture, etc.) and flow regulation of the San Juan River and its tributaries, or to accurately predict environmental impacts from proposed development scenarios.

Little is known concerning the tolerance levels of Colorado squawfish and razorback sucker to potential contaminants in the San Juan River. Criteria presently available for use in analysis of project impacts have been based on conditions not present in the river and were developed using other fish species. The concentration of contaminants that may impact the endangered fish species should be quantified, while considering the synergistic relationships of the particular water quality conditions of the river (i.e., determination of criteria levels for selected contaminants singly and in conjunction with other contaminants). Since many of the contaminants are a part of the natural river system, elimination of these contaminants is not possible. Other contaminants derive completely or predominately from development activities and can be eliminated, or at least reduced to a level deemed unlikely to have chronic or acute effects upon members of

the aquatic community.

3.4.2 Course of Action

3.4.2.1 Research

- a. Historic water quality information on the San Juan River will be compiled, evaluated, and synthesized. Because of the potential to impact the contribution of the flows of the Animas River through development of the Animas-La Plata Project, particular emphasis will be given to the Animas River and other tributaries and their contributions to the water quality of the mainstem San Juan River.
- b. Types and sources of contaminants will be identified and characterized.
- c. Research will be initiated to determine and quantify the biological effects of various forms of selenium and other contaminants, such as polycyclic aromatic hydrocarbons (PAHs), on survival, growth, and reproduction of endangered fishes and other native fish species.
- d. Changes in water chemistry will be investigated and compared to the hydrologic cycle as well as to identify changes caused by inflows and discharges.
- e. A monitoring program will be instituted at a series of sites to systematically characterize the water quality of used and potential habitats of the endangered fish species in addition to sampling the problem areas. This program will also be used to evaluate the effectiveness of any recovery action initiated as a result of this research.

3.4.2.2 Recovery

- a. Numerous studies and monitoring programs have produced data on different aspects of water quality in the San Juan River basin. A data base, utilizing existing information, will be developed. This information will form the basis upon which to evaluate and characterize current conditions and to determine courses of action for remedying any identified problems. Expansion of environmental monitoring, in concert with specific investigations on both acute and chronic biological responses of the native community to contaminants, will be implemented to increase and improve the data base for consideration of water quality issues in recovery

decisions and actions.

- b. Implementation Program Participants will pursue actions necessary to bring about water quality improvements found necessary for recovery of the endangered fish species and conservation of other native fish species populations consistent with state and federal regulations.
- c. Measures will be taken to diminish or eliminate sources of contaminants that are identified as limiting recovery of endangered fish species populations.

3.5 INTERACTIONS BETWEEN NATIVE AND NON-NATIVE FISH SPECIES

3.5.1 Statement of Problem

The native fish fauna of the Colorado River drainage historically was comprised of 14 species, including six that are endemic to the system. Compared to the fish fauna of more mesic regions, that of the Colorado River is depauperate. Native Colorado River drainage fishes evolved in a system characterized by extreme seasonal fluctuations in flow regimes. Habitats ranged from small, headwater tributaries where coldwater-tolerant forms such as Colorado River cutthroat trout were abundant to large, turbulent, silt-laden rivers where especially adapted forms such as humpback chub and Colorado squawfish flourished. Other species such as speckled dace and flannelmouth sucker, more generalist in adaptations, were widespread and common in suitable habitats.

Modification of aquatic systems to satisfy human desires diminished availability and quality of habitats suitable for native fishes and, therefore, many species declined dramatically in distribution and abundance. Human-induced habitat modifications also created conditions conducive to establishment of non-native fish species. Since the late 1800's, at least 40 non-native fish species have been introduced intentionally or accidentally to the rivers and reservoirs of the Upper Colorado River Basin. The specific role of any single non-native species in the decline of a native fish species is difficult to assess, and several non-native species negatively interact with native species in multiple manners. Non-native fish species, such as red shiner and northern pike, compete with or prey upon native fishes, a few, such as rainbow trout, hybridize with and compete for resources with native fish species, and others, such as fathead minnow and plains killifish, have no discernable or demonstrated effect. Some non-native species occur infrequently or in such low numbers (e.g., green sunfish in the San Juan River) that their impact on native fishes is limited, if any. Several non-native fish species (red shiner and channel catfish) compete with or prey upon early life stages of native fishes and

subsequently they become prey for piscivorous native fishes. In a few instances, native predatory fish may utilize introduced forms (e.g., rainbow trout) when native prey are absent or greatly diminished in abundance.

In the San Juan River sub-basin, 23 non-native fish species have been reported. In comparison to other Upper Colorado River Basin drainages, the San Juan has few common or widely distributed non-native fish species. Of these, only common carp and channel catfish are common in main channel habitats within warmwater reaches and red shiner and fathead minnow are the most common non-natives in associated low-velocity habitats. Other non-native species in warmwater reaches are uncommon or occur sporadically. In main channel habitats, native fish species remain numerically dominant, but non-natives numerically dominate many low-velocity habitats.

Although the impact of non-native fishes upon the native fish fauna has been known for some time, and means to eliminate or reduce problem species are limited, expensive, and usually not feasible, the potential to conduct such actions in this Implementation Program will be evaluated. An essential element of any control effort is accurate definition of the problem. Among non-native fishes inhabiting the San Juan, the mode of interaction of particular non-native species with specific native species (or life stages of each) is not clearly defined. For example, adults of channel catfish consume a variety of food items, including fish. However, the relative impact of their foraging habits upon particular life stages of Colorado squawfish or other natives is not known. In low-velocity habitats, young of Colorado squawfish may compete for food and habitat with several non-natives. The effect of this presumed competition upon recruitment of young of Colorado squawfish to larger size-classes is unknown.

Although the San Juan River drainage is occupied by several warmwater non-native fish species, additional stocking of these species or introduction of new species will only exacerbate problems. In this sense, the best control is prevention of potential problems by eliminating stocking of non-native warmwater species.

The high flows of 1987 demonstrated an effective method of control of non-native species. That year, successful reproduction by channel catfish was markedly lower than in subsequent years when spring run-off was much lower and of shorter duration.

Other controls, such as chemical treatment, are biologically and logistically infeasible in almost all situations on the San Juan River. Some actions, while not strictly control, may be warranted in particular instances. Such actions might include

habitat modifications to the detriment of non-native fishes, and presumably the benefit of native species.

Stocking of most non-native fish species in the San Juan Drainage has been greatly curtailed in recent years; neither New Mexico nor Utah has stocked non-native warmwater species in the San Juan River in recent years. All non-native fish stocking in New Mexico and Colorado is limited to salmonids in upstream, coldwater reaches. Illegal stocking and bait minnow releases remain potential problems.

3.5.2 Course of Action

3.5.2.1 Research

- a. Characterize distribution and abundance of each non-native species.
- b. Identify and characterize habitats used by each life stage of common and "problem" non-native fish species.
- c. Identify non-native species which may or do interact with native fish species, develop research protocols to define the nature and extent of interactions between and among native and non-native fish species, and describe modes of interaction among subject species.
- d. Characterize response of populations of non-native fish species to various flow regimes and modification of habitats.
- e. Characterize significance of autochthonous production in tailwater reach to downstream habitat areas.
- f. Monitor and evaluate any efforts undertaken to diminish or eliminate "problem" non-native fish species.

3.5.2.2 Recovery

- a. Secure agreement among responsible resource agencies (state, federal, and tribal) to discontinue stocking of warmwater fish species in known, likely, or potential habitats of endangered fish species in the San Juan River.
- b. Limit stocking of non-native fish species to salmonids and restrict stocking to those habitats where endangered species do not or are not likely to occur and that are not important to the recovery of the endangered species.

- c. Institute regulations by appropriate state, federal, and tribal agencies to ban bait-minnow seining in habitats known or believed to support endangered fish species.
- d. Institute regulations by appropriate state, federal, and tribal agencies to ban import of extra-basin bait minnows to the San Juan River basin.
- e. Recommend and implement actions or management strategies, including flow manipulation or piscicide application, to reduce or eliminate negative impacts of non-native species upon native fishes.
- f. Implement efforts to disseminate information to the public to improve compliance with laws and regulations regarding introduction of non-natives and endangered species recovery.
- g. Implement a rigorous law enforcement program to minimize violations of laws and regulations regarding introduction of non-natives and endangered species.

3.6 MONITORING AND DATA MANAGEMENT

3.6.1 Statement of Problem

Monitoring is needed to evaluate status and trends of endangered fish species and other native and non-native species populations, and to define the overall success of this Implementation Program, not the least of which is the determination of viability of conservation efforts and the results of hypothesis testing. A data management system is therefore required to provide a repository for data obtained during and after the research period and serve as a central clearinghouse for dissemination of such data.

Federal, state, tribal, and private entities have collected extensive data on the life history, behavior, and habitat requirements of endangered fish species in the Upper Colorado Basin. The status and quality of these data are variable, and improved management and analysis of these data are priority management needs. A centralized data management system has been established for the Upper Basin to make the best possible use of existing data and ensure a coordinated and effective data management and analysis effort in the future. Such a system is key to conducting cost-effective research and monitoring programs in the San Juan River basin.

3.6.2 Course of Action

3.6.2.1 Research

- a. During the research period, monitoring will be accomplished by regularly scheduled and systematic inventories.
- b. Standardized methods will be used by all groups so that spatial and temporal trends can be identified and compared.
- c. The San Juan River data management will be compatible with that of the upper Colorado River Recovery Implementation Program.

3.6.2.2 Recovery

In order to facilitate the storage and provision of data for research, consultation, and recovery activities, the Service (Region 2) will

- a. Assume data management responsibilities for this Implementation Program.
- b. Coordinate monitoring responsibilities with the federal agencies, states, and tribes.
- c. Define a process for periodic review of monitoring and data management activities.
- d. Ensure that all data management activities are compatible with those of Region 6 and all data are available for use by that Region.

4.0 COMPLIANCE WITH THE ENDANGERED SPECIES ACT

4.1 REQUIREMENTS OF COMPLIANCE

Section 7 (a) (1) of the Endangered Species Act directs all federal agencies to utilize their authorities in furtherance of the purposes of the Act by carrying out programs for the conservation of endangered and threatened species. The terms "conserve," "conserving," and "conservation" are defined in the Act as to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary.

Section 7 (a) (2) of the Act further requires that all federal agencies consult/confer with the U.S. Fish and Wildlife Service regarding species protected under the Act. Consultation is necessary to ensure actions authorized, funded, or carried out by such agencies are not likely to jeopardize the continued existence of any threatened or endangered species, or result in the destruction or adverse modification of designated critical habitat. The Endangered Species Act states that each federal agency will confer with the Service "on any action which is likely to jeopardize the continued existence of any species proposed to be listed . . . or result in the destruction or adverse modification of critical habitat proposed to be designated for such species."

Formal section 7 consultation is required for any federal action that "may affect" listed species or result in destruction or adverse modification of critical habitat. A conference is required if a federal action is likely to jeopardize the continued existence of any species proposed for listing as threatened or endangered, or result in the adverse modification of proposed critical habitat. The procedures and agency responsibilities under section 7 consultation must be followed for such federal actions in the Basin, including actions under this Implementation Program.

In rendering biological opinions on federal actions resulting in minor depletions, the Service will consider all new information concerning project impacts and the status of the listed species, and good faith implementation of this Implementation Program in determining if sufficient progress toward recovery has been made to offset depletion impacts, or any other project-induced impacts, on listed fish. It is understood that the aggregate of all minor depletions subject to section 7 consultation during the 7-year research period may result in a total annual depletion of not more than 3,000 acre-feet under the conditions of this paragraph.

Changes in circumstances regarding project design or species status may also prompt reinitiation of consultation for federal projects that have previously undergone section 7 consultation and where there is still federal control or involvement. Specifically, 50 CFR 402.16 requires reinitiation of formal consultation if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may impact listed species or critical habitat in a manner or to an extent not considered in a biological opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species not considered in the biological opinion issued for the action; or (4) a new species is listed or critical habitat designated that may be affected by the action.

As stated in the MOU (Appendix A), "It is anticipated that Section 7 consultations will be initiated for all existing federal actions within the baseline for the ALP that are subject to consultation. The Service concluded that the reasonable and prudent alternative will offset 57,100 acre-feet of depletion for the ALP in addition to the depletions in the baseline. The operation of Navajo Dam to benefit the listed fish will be taken into account by the Service in its biological opinions on the depletion impact of these existing federal actions."

When requested, the Service will consult with a federal agency which is not a Participant in this Implementation Program. During such consultations, the Service will not consider any reasonable and prudent alternative which is based on progress as a result of this Implementation Program, without discussions with the Coordination Committee.

4.2 PROCESS OF COMPLIANCE

4.2.1 Sufficient Progress

During and after the 7 year research period (as described in the ALP biological opinion) on the San Juan River and its tributaries, significant new information will be available on the listed fish. Also certain recovery actions will have been implemented to benefit the listed fish. Such information and actions will constitute progress under the Implementation Program and will be considered by the Service in determining whether progress has been sufficient to offset impacts of future federal actions which are likely to jeopardize the listed fish.

The Service will determine if sufficient progress has been made under this Implementation Program based on the best available biological data and professional judgement. The Service will assess progress toward recovery in proportion to the potential jeopardy impacts of a proposed federal action. That is, the

smaller the impact of a federal action, the lower the level of progress needed to offset the impacts. If progress under this Implementation Program has not been sufficient, actions will be required from the federal agency or project sponsors to offset impacts of the federal action which are likely to jeopardize the endangered fish species.

The following are some examples of actions that will constitute progress toward recovery because they are expected to lead to a positive biological response of the endangered fish species (including, but not limited to, increased abundance, improved health, improved or increased survival) or improvement of their habitat (including, but not limited to, the availability, extent, or quality of those habitats). However, the actions, in and of themselves, may or may not constitute progress sufficient to offset potential jeopardy impacts to the endangered fish species from the proposed federal action which is under section 7 consultation.

- Modification of federal projects to maintain the level of depletions in the section 7 environmental baseline as described in the biological opinion for the ALP (baseline)

- Modifications to existing and proposed federal actions (i.e., measures) to lessen impacts to listed fish

- Acquisition of water for the benefit of listed fish

- Legal protection of water, including protection of reservoir storage releases, for the benefit of the listed fish to and through their habitat

- Operation or modification of federal projects to benefit listed fish

- Improvements to water quality in habitat areas used by listed fish

- Indications that listed fish populations or habitats are improving

- Support and participation by the parties in developing and carrying out the Implementation Program (including adequate funding)

- Identification of flow needs for the listed fish

- Physical habitat enhancement (e.g., removal of barriers, construction of fish passage facilities, improvement of spawning and nursery habitats, etc.)

- Control of exotic species